

**ARBOR CONSTRUCTION FOR ON-SITE ASSEMBLY****FIELD OF THE INVENTION:**

[0001] This invention relates to decorative arbors, and particularly to arbors that may be assembled on site without the necessity to use any additional fastener elements. Specifically, the invention relates to decorative  
5 arbors which, when assembled on site, may be snap-fitted together in a matter of minutes. Once assembled, the arbors of the present invention demonstrate significant stability and strength.

**BACKGROUND OF THE INVENTION:**

10 [0002] Decorative arbors are well known and have been placed in gardens by homeowners and estate owners and managers, landscapers and landscape architects, and the like, probably for many hundreds of years. Quite typically, such arbors as are known to exist are made of wood, requiring painting and other maintenance on a constant basis. Arbors typically have a  
15 lattice appearance, and as they are manufactured from wood the lattices are thin wooden slats or strips which have only limited strength and durability. Moreover, since owners of arbors which are placed in their gardens or on their grounds may choose sometimes to permit plants such as climbing roses or ivy to grow on their arbor, much the same as the would on a trellis, the problem of  
20 maintenance particularly for such tasks as painting becomes exacerbated.

[0003] However, plastics material which might be considered as an appropriate substitute material has also a number of disadvantages. They include also a lack of strength in some respects, and a lack of appropriate means by which an assembly of plastic pieces may be constructed without the  
25 use of additional fastening means such as screws, or appropriate adhesives and the like.

[0004] Quite unexpectedly, the inventor herein has discovered that there are indeed certain plastics materials which can be injection molded in large sized pieces and which can be designed so as to be snap-fitted together. Moreover, the inventor herein has discovered that with appropriate use of snap-fitted design, an arbor may be manufactured for assembly at the site where it is to be placed, and which, when assembled, has significant strength and rigidity. Indeed, quite unexpectedly, arbors which are in keeping with the present invention, as described hereafter, demonstrate significant side-to-side, front-to-back, and corner-to-corner rigidity. They are thus able to withstand the rigors of exposure to severe weather over many changes of seasons, and to withstand inadvertent impact of objects therewith, as well as to support significant weight suspended therefrom such as potted plants and the like.

[0005] By appropriate selection of injection moldable plastics material, that material can be made to withstand rain, ice, sunlight and ultraviolet radiation, and so on. As well, by injection molding a suitable plastics material, the material can be colored so as not to require painting and yet maintain the color for a number of years; and the material may also have a special surface molded therein such as a wood grain appearance, a pebble-like appearance, and the like.

[0006] Typically, an appropriate plastics material which can be molded in large physical sizes is high density polyethylene or high density polyethylene foam. However, certain low density polyethylene and low density polyethylene foam materials may be used, as well as other plastics material such as polyvinyl chloride. The specific plastics material which is employed is a matter of choice to those skilled in the art; however, high density polyethylene and high density polyethylene foam are known to be particularly useful.

[0007] It is a particular purpose of the present invention to provide an arbor which can be injection molded and packaged, and shipped to the site where it is to be erected by on site assembly, preferably without the use of any tools and certainly without the necessity for the use of fastening materials or members such as screws or adhesives.

[0008] It is also the intent of the present invention to provide such an arbor that exhibits significant strength and rigidity when assembled. Moreover, the weight of the arbor when it is manufactured should be such that it can be handled by one or two persons without difficulty; but also it is such that, when assembled, it will not easily be moved such as by a strong wind, even if it is not otherwise anchored to the location where it has been placed.

#### **SUMMARY OF THE INVENTION:**

[0009] To that end, the present invention provides an arbor which may be assembled on site without the use of additional fastener elements.

[0010] The arbor comprises a pair of side panels having inner and outer surfaces, where each side panel has a vertical U-shaped channel with a base member and two side walls at each edge of the side panels, and wherein each U-shaped channel faces outwardly.

[0011] There are four cap members, each of which adapted to fit into and over one of the U-shaped channels to close the same.

[0012] There are a pair of arch members, each having top and bottom edges, and opposed vertical edges at each edge thereof. The curvature of the top edge of each arch member has a larger radius than the curvature of the bottom edge.

[0013] There is also a curved roof panel member which has opposed end edges and opposed side edges.

[0014] It should also be noted that the curvature of the curved roof panel is the same as the curvature of the top edge of each of the arch members.

5 [0015] There are a plurality of downwardly facing hook members formed in each of the vertical side edges of each of the arch members, and an equal plurality of cooperating openings adapted to receive each of the downwardly facing hook members which are formed in the upper region of each of the U-shaped channels of the side panels.

10 [0016] Moreover, there are a plurality of upwardly facing split pins formed in the top edges of each of the side panels and each of the arch members, and an equal plurality of openings adapted to receive those upwardly facing split pins formed in the end edges and the side edges, respectively, of the curved roof panel.

15 [0017] Thus, the arbor may be assembled on site by fitting the arch members to the side members, and by fitting the curved roof panel to the assembled arch members and side panels.

[0018] Typically, the cap members are formed as U-shaped channels, and have a plurality of lugs extending forwardly from the ends of each side wall thereof.

20 [0019] Also, there is an equal plurality of slots to receive the lugs that are formed in the base member of each of the U-shaped channels at the side edges of the side panels.

25 [0020] The arbor of the present invention may be such that at least the lower portion of each of the assembled U-shaped channels at the side edges of the side panels together with the cap members, is dimensioned so as to accommodate a vertically extending post placed on site at the location where the arbor is to be assembled.

[0021] Typically, each component of the arbor of the present invention is formed from injection molded plastics material.

[0022] If so, the plastics material is chosen from the group consisting of low density polyethylene, low density polyethylene foam, high density polyethylene, high density polyethylene foam, polyvinyl chloride, and combinations thereof.

[0023] As a matter of design, the arbors in keeping with the present invention may be such that each of the side panels, the arch members, and the curved roof panel, may be molded with a crossed lattice motif formed therein.

[0024] A particular design feature of the present invention provides that each of the split pins which is formed in the top edges of the side panels and the arch members has an enlarged knob formed at the upper end thereof, and each of the cooperating openings formed in the curved roof panel has a diameter which is less than that of each enlarged knob.

#### **BRIEF DESCRIPTION OF THE DRAWINGS:**

[0025] The novel features which are believed to be characteristic of the present invention, as to its structure, organization, use and method of operation, together with further objectives and advantages thereof, will be better understood from the following drawings in which a presently preferred embodiment of the invention will now be illustrated by way of example. It is expressly understood, however, that the drawings are for the purpose of illustration and description only and are not intended as a definition of the limits of the invention. Embodiments of this invention will now be described by way of example in association with the accompanying drawings in which:

[0026] Figure 1 is a perspective view of an assembled arbor which is manufactured and assembled in keeping with features of the present invention;

5 [0027] Figure 2 is a perspective view of a side panel before the end caps are assembled thereto;

[0028] Figure 3 is an enlarged perspective view of an end cap in keeping with the present invention;

[0029] Figure 4 is a perspective view of a detail of an unassembled side panel;

10 [0030] Figure 5 is an exploded perspective view showing the manner in which the five principal components of an arbor in keeping with the present invention are to be assembled;

[0031] Figure 6 is a perspective view of the curved roof panel member of an arbor in keeping with the present invention; and

15 [0032] Figure 7 is an exploded detailed view showing the manner in which the curved roof panel is assembled to a side panel and an arch member of an arbor in keeping with present invention.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS:**

20 [0033] The novel features which are believed to be characteristic of the present invention, as to its structure, organization, use and method of operation, together with further objectives and advantages thereof, will be better understood from the following discussion.

25 [0034] An arbor which is typical of those manufactured in keeping with present invention, and assembled on site, is shown at 10 in Figure 1. As will be seen hereafter, there are five principal components which comprise the arbor, and they are assembled from nine individual components, all of which

have been injection molded. The principal components are the two side panels 12; the two arch members 14; and the curved roof panel member 16.

[0035] However, reference to the details shown in Figures 2 to 5, and 7, shows that each of the side panels 12 is, in fact, assembled from three components, including two cap members 18. As seen particularly in each of Figures 2, 3, and 4, each of the side panels 12 is injection molded so that each side panel 12 has an inner surface and an outer surface, where inner and outer are determined with reference to the manner in which the side panels are to be assembled as the arbor is constructed. Figure 2 shows an unassembled side panel in which the cap members 18 have not yet been placed; but in the orientation as shown in Figure 2, the respective side panel 12 which is shown in that figure will be the left side panel of the assembled arbor 10 as it is shown in Figure 1.

[0036] It will be seen that each of the side panels 12 is also molded so as to have a vertical U-shaped channel formed at each edge thereof. Each of the U-shaped channels has a base member 22 and two side walls; and as seen in Figure 2, each of the U-shaped channels faces outwardly. It will also be learned from a study of Figure 7 that each of the cap members 18 fits into and over one of the U-shaped channels of each of the side panels 12. This assembled cap member and U-shaped channel provides a substantial post-like appearance for the arbor, and contributes to the strength of the side panels 12 and thus to the strength of the arbor 10.

[0037] The appearance of each of the arch members 14 may be particularly determined from Figures 1 and 5. It will be seen that each of the arch members 14 has opposed vertical side edges 26, and that each arch member 14 has a top edge in 28 and a bottom edge 30. With it is important to note is that the curvature of the top edge 28 is such that it has a larger radius than the curvature of the bottom edge 30.

[0038] It will also be readily determined from Figures 1 and 5 that the curvature of the curved roof panel member 16 is the same as the curvature of the top edge 28 of each of the arch members 14.

[0039] The assembly of the arbor 10 will now be discussed. It has already been noted that the cap members 18 are fitted over and into the U-shaped channels that are formed at each edge of the side panels 12. Indeed, the usual manner in which the arbor 10 in keeping with the present invention is shipped from the manufacturing facility is with the end cap members 18 already assembled into the U-shaped channels at the edges of the side panels 12. Thus, when the arbor 10 is shipped for assembly on site at the selected location, it is shipped with five principal components -- the two assembled side panels 12, the two arch members 14, and the curved roof panel member 16.

[0040] It will be seen in Figure 5 that there are a plurality of downwardly facing hook members 40 that are formed at each of the vertical side edges 26 of each of the arch members 14. There are also an equal plurality of cooperating openings 42 which are adapted to receive the downwardly facing hook members 40, and which are formed in the upper region of each of the U-shaped channels at the edges of each of the side panels 12. It can be understood that assembly of the arch members 14 to the side panels 12 is achieved by placing the hook members 40 into the cooperating openings 42, and then moving the arch members 14 downwardly. It should be noted that the cooperating openings 42 are, themselves, molded so as to provide a recessed lip 44 which is dimensioned so that when the downwardly facing hook members 40 are received in the cooperating openings 42, they effectively snap into place.

[0041] It will be understood, of course, that the curvatures of the top and bottom edges of the arch members 14, as shown in 28 and 30, contribute significantly to lateral strength of the arbor. It is well known that an



arch exhibits significant resistance to forces applied downwardly or sideways against it; and it will be understood that the lip and snap fit arrangement of the downwardly facing hook members 40 into the cooperating openings 42, together with the structure of the arch members 14, will resist forces that might otherwise tend to move the bottoms of the side panels 12 either towards each other or away from each other.

[0042] Once the arch members 14 have been assembled to the side members 12, then the curved roof panel member 16 can be assembled to the side panels 12 and the arch members 14. It will be recalled that the curvature of the curved roof panel member 16 is the same as the curvature of the top edge 28 of each of the arch members 14; and it will be noted that the top edge of each of the side panels 12 and the ends of the curved roof panel member 16 are straight. Now, it will be noted that there are a plurality of upwardly facing split pins 50 that are formed on the top edge 54 of each of the side panels 12, and on the top edge 28 of each of the arch members 14. It will also be seen that there are a plurality of openings 52 which are formed in the end edges and side edges of the curved roof panel member 16. Obviously, each of the openings 52 is adapted to receive a respective one of the split pins 50.

[0043] It will now be evident that assembly of the arbor 10 can be easily accomplished in just a few minutes -- typically, less than 10 minutes -- and that the assembly of the arbor 10 is accomplished without the necessity for the use of special purpose tools or for the use of additional fastener elements such as screws or the like, and neither is the use of adhesive necessary.

[0044] Once the arbor 10 has been assembled, as described above, it can now be easily understood that the assembled arbor 10

demonstrates significant side-to-side, front-to-back, and corner-to-corner rigidity.

[0045] The assembly of the cap members 18 to the U-shaped channels can be understood particularly from Figures 2 and 3. Here, it will be seen that each of the cap members 18 is formed also as a U-shaped channel, and that there are a plurality of lugs 56 which extend forwardly from the ends of each of the side walls 58 of the cap members 18. There are also a plurality of the slots 60 which are formed in the base member of each of the U-shaped channels at the side edges of the side panels 12. Each of the slots 60 is, of course, adapted to receive one of the lugs 56. When assembled, the ends of the lugs 56 are flush with the surrounding surface of the outer side of the U-shaped channels formed in the side panels 12.

[0046] Referring particularly to Figures 2 and 4, it will be seen that typically there is a wall 64 which is formed across the bottom of the U-shaped channel which comprises most of the length of each of the end caps 18. It will be understood that when the end cap members 18 are assembled to the side panel members 12, there is a region at the bottom of the corner posts of the arbor 10, indicated generally at 66, and the purpose of that region 66 is to accommodate a vertically extending post that may have been placed into the ground on the site at the location where the arbor 10 is to be assembled. Then, the arbor can be secured to the wooden post by such as a screw or nail through openings 70. However, it will also be understood that the arbor 10 will stand on its own without necessarily otherwise being anchored in place.

[0047] It has been noted that each of the components of the arbor 10 is injection molded from a suitable plastics material. Such materials include, but are not necessarily limited to, low density polyethylene, low density polyethylene foam, high density polyethylene, high density polyethylene foam, polyvinyl chloride, and combinations thereof.

[0048] It should also be particularly noted that the design of the split pins 50 and the downwardly facing hook members 40, and also the cooperating openings 42 and 52, are such that they may be profiled and yet easily released from the injection mold because they are formed in the molding direction -- that is to say, in the direction in which the mold separates when it is opened. There is therefore no necessity for post-molding machining or other processing step to be taken.

[0049] It will be understood that a considerable number of design choices may be made in the manufacture of arbors in keeping with present invention, and so as to suit different purchasers and users thereof. For example, the side panels 12 as they are illustrated in the accompanying drawings are shown to have a diamond shaped opening 80 formed therein. By the simple expedient of replacing an insert in the injection mold, that opening can be changed to another opening such as circular, or it can be eliminated all together. Also, typically but not necessarily, arbors in keeping with present invention are molded so that each of the side panels, each of the arch members, and the curved roof panel, have a crossed lattice motif formed therein.

[0050] Each of the split pins 50 is typically molded so as to have an enlarged knob 74 formed at the upper end thereof. Also, each of the openings 52 has a diameter which is less than that of the enlarged knob, so that when the curved roof panel 16 is assembled to the side panels 12 and the arch members 14, the split pins 52 compress towards their split in order that a secure snap fitment of curved roof panel member 16 to the side panels 12 and the arch members 14 is attained.

[0051] There has been described and the arbor which is manufactured from a plastics material by injection molding techniques, and which may be assembled on site at the location where the owner has chosen.

The arbor can be shipped to that location as five principal members. When the arbor is assembled, it does not require the use of special tools or fastening elements.

5 [0052] A typical arbor in keeping with present invention may have an overall width of about 142 cm. (56 inches), a front to back dimension of about 81 cm. ( 32 inches), and an overall height of about 221 cm. ( 87 inches). The walk-through passageway formed between the side panels 12 and below the arch members 14 is typically about 122 cm. (48 inches) wide, and the height of the walk-through passageway is typically about 213 cm. ( 84 inches)  
10 at its greatest.

[0053] Other modifications and alterations may be used in the design and manufacture of the apparatus of the present invention without departing from the spirit and scope of the accompanying claims.

[0054] Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not to the exclusion of any other integer or step or group of integers or steps.